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(21) International Application Number: PCT/GB97/00716 (22) International Filing Date: 14 March 1997 (14.03.97) (30) Priority Data: 9605597.5 16 March 1996 (16.03.96) GB (71) Applicant (for all designated States except US): CADBURY SCHWEPPES PLC [GB/GB]; 25 Berkeley Square, London W1X 6HT (GB). (72) Inventors; and (75) Inventors/Applicants (for US only): ZUMBE, Albert [GB/GB]; 249 Broad Lane, Coventry CV5 7AQ (GB). SANDERS, Nigel [GB/GB]; 2 Overlands, Red Hall Farm, Broome, Clent, Stourbridge, West Midlands DY9 0EX (GB). (74) Agents: PEARCE, Anthony, Richmond et al.; Marks & Clerk, Alpha Tower, Suffolk Street Queensway, Birmingham B1 1TT (GB).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
(54) Title: PROCESS FOR MAKING EXPANDED CONFECTIONERY SHAPES (57) Abstract <p>A process for making expanded, malt-flavoured confectionery shapes comprises forming an extrudable edible composition containing malted milk and malt extract as main ingredients, and an expanding agent such as a bicarbonate. The composition is extruded, using an extrusion cooker supplied with carbon dioxide as a further expanding agent, through a die to form an extruded length of expanded malt-flavoured confection. The extruded length is then cut into portions of the desired size, shaped and dried.</p>		

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PROCESS FOR MAKING EXPANDED CONFECTIONERY SHAPES.

This invention relates to a process for making confectionery and is more particularly concerned with a process for making expanded, malt-flavoured confectionery shapes such as balls and bars.

It is known to manufacture expanded malt-flavoured confectionery shapes such as malted balls by forming a dough containing malted milk and malt extract as main ingredients, forming such dough into the required shape and then heating in a vacuum oven. This last step is expensive in energy and labour costs and is essentially a batch process. Continuous vacuum ovens are expensive.

It is an object of the present invention to provide a process for making expanded, malt-flavoured confectionery shapes which can be more economical than existing processes.

According to the present invention, there is provided a process for making expanded, malt-flavoured confectionery shapes comprising the steps of forming an extrudable edible composition containing malted milk and malt extract as main ingredients, extruding said composition with an incorporated expanding agent through a die to form an extruded length of expanded malt-flavoured confection, and subsequently forming the extruded length into the required shapes.

Thus, the process of the present invention avoids the need to perform the expensive step of heating under vacuum.

The expanding agent may be incorporated into the composition by incorporating an expanding agent, e.g. a chemical expanding agent such as sodium or potassium bicarbonate or a fermenting agent such as a yeast, as an ingredient of the composition. Alternatively or additionally, a gaseous or vapourisable expanding agent, e.g. gaseous or supercritical carbon dioxide or nitrogen or compressed air, may be incorporated into the composition by feeding such expanding agent into a pre-extrusion zone of an extruder used to extrude the composition.

As a further alternative, a gas, e.g. air, may be incorporated into the composition mechanically e.g. by whipping the composition.

It is particularly preferred to use a combination of carbon dioxide injection and carbon dioxide released by decomposition of bicarbonate included in the composition for effecting the expansion of the confectionery during extrusion. Thus, a combination of a chemical expanding agent (by release of gas from a component of the composition) and direct injection into the composition within the extruder just prior to being extruded is a preferred procedure.

The use of bicarbonate can help to develop a caramelised flavour if this is required in addition to the malt flavour. The use of bicarbonate also helps to maintain the expanded state after extrusion because it decomposes relatively slowly. The preferred amount of bicarbonate is about 0.5 to 2 wt% (more preferably about 1 wt%) based on the total solids content of the composition being extruded. To enhance carbon dioxide production from the bicarbonate, it is possible to include an acid in the composition. Such acid is preferably in solid form and may be an acid such as malic acid, citric acid, tartaric acid or an acid salt (a salt of a

strong acid and a weak base). For a bicarbonate content of 2 wt%, the acid may typically be present in an amount of about 0.5 wt%.

Instead of the bicarbonate being initially mixed in dry form with the other ingredients of the composition which is to be extruded, it is within the scope of the present invention for it to be added at a later stage to the extruder either in the form of a powder or as a slurry or solution in water.

The malted milk and malt extract are preferably provided in powder form. The composition to be extruded may contain, in addition to malted milk and malt extract and the optional expanding agent ingredient, skimmilk or wholemilk powder, glucose syrup, maltodextrin, vegetable oil or fat, starch, emulsifier and/or binding ingredients such as gluten, casein, pectin, gum and/or gelatin. The composition may further contain flavouring such as malt flavouring. Whilst many of these ingredients may be in liquid or dry form, the dry form is to be preferred. The moisture content can affect the temperature at which the bicarbonate starts to decompose. Water may be added to the extruder if required.

The composition may be produced by thoroughly mixing the ingredients of the composition in a blender or a preconditioner before they are added to a feed zone of an extruder used for performing the extruding step. Water may be added separately to act as a temporary binder. The moisture content at this stage should generally not exceed about 10 wt% of the total weight of the composition.

It is preferred to use an extrusion cooker for performing the extruding step. The extrusion cooker may be of the single-screw or twin-screw type. If of the latter type, the screws may be co-rotated or counter-

rotated, with co-rotation being preferred because it promotes improved mixing without introducing excess shear for this type of product and also because it can be operated at a relative high rpm which, combined with a positive pumping action, enables a high product throughput. By use of an extrusion cooker of the screw type, blending, introduction of the gaseous or vaporisable expanding agent, and partial expansion can be continuously performed. Expansion is completed as the extrudate is formed and moisture content is reduced as a result of heating during extrusion.

Extrusion is preferably effected at an elevated temperature which does not exceed 100°C, and which is preferably maintained in the range of 40 to 70°C.

The extrusion die may be of any desired shape depending upon the form required, for example circular or rectangular.

The forming step effected on the extruded length to produce the required shapes may simply be a transverse cutting operation to cut the extrusion to the length required in the final confectionery product. Alternatively, the forming step may include cutting the extrusion into pieces of a length approximately equal to the width or diameter of the extrusion, coating the cut pieces with starch to prevent them from adhering to one another, and then subjecting such cut and coated pieces to vibration, tumbling or other procedure to convert the shape to a more nearly spherical shape. The shaped "balls" can then be transferred to a cooler, e.g. a cooling reel, where they are cooled to below the glass transition temperature to assist in setting the ball shape prior to drying to the required moisture content (e.g. up to 3 - 4 wt%, preferably 2 - 3 wt%).

In an alternative procedure for forming "balls", the extruded length is fed to either a rotary-form die head or a chain form die head to produce near-spherical balls which are then cooled to below the glass transition temperature to set the shape, followed by drying to the required moisture content (e.g. up to 3 - 4 wt%, preferably 2 - 3 wt%). The near-spherical balls may be subjected to a heating operation to effect further expansion before being cooled and dried.

Subsequently, the confectionery shapes may be sent for packaging or they may be subjected to a further procedure, for example enrobing with, for example, a chocolate coating composition.

The present invention will now be described in more detail in the following Examples.

Example 1

Recipe (by weight)

Malted milk powder	58.92
Malt extract powder	22.41
Maltodextrin	8.99
Gluten	7.23
Palm kernel oil	1.08
Sodium bicarbonate	0.67
Glyceryl monostearate	0.45
Malt flavouring	0.25
	100.00

A 50kg batch was weighed according to the above recipe and mixed in a ribbon blender. The resultant composition was added to section 1 of the feed zone of a 9-section Wenger TX52 twin co-rotating screw extrusion cooker at the rate of 50 kg/hr. Water was added to section 2 at the rate of 1.3 kg/hr. Section 6 of the extruder was furnished with a vent which, in this Example, was capped. The extruder shaft speed was 150 rpm and extruder motor load was 52%. The temperature in sections 3 to 9 was maintained between 50 and 55°C. Carbon dioxide was injected at 250 psi (1.72 MPa) in section 8, before extrusion of the mass at 2760 kPa from section 9 through a circular die to form a continuous extruded length in the form of a rope. A gas seal was provided to prevent carbon dioxide introduced into section 8 from passing into earlier sections of the extruder upstream of section 8.

The rope emerging from the die was passed under a starch feeder to be coated with starch before being cut by a spring-loaded knife producing small cylindrical pieces. These were transferred to a vibrating conveyor to form approximately spherical pieces which were then dried at 101°C for 35 minutes in a multipass dryer.

Example 2

A 50kg batch was weighed, blended and added to a Wenger TX52 extrusion cooker at a rate of 50 kg/hr as described in Example 1. Water was added to section 2 of the extruder at a rate of 1.3 kg/hr. The extruder shaft speed was 160 rpm and the extruder motor load was 46%. The temperature in sections 3 to 9 was maintained between 45 and 55°C. Carbon dioxide was injected at 2.07 MPa in section 8 before

extrusion of the mass at 2760 kPa from section 9 through a rectangular (22.2mm x 1.78mm) die slot. The extruded ribbon was cut into 100mm long pieces and dried at 101°C for 25 minutes in a multipass dryer.

Example 3

Example 1 is repeated with the exception that the spherical pieces from the vibrating conveyor are dried for 20 minutes at 118°C in a rotary drying drum with perforated drying zones through which heated air is circulated under pressure. Following such drying, the spherical pieces are further dried in the multipass drier for 40 minutes at 82°C to remove about 0.5% moisture and increase crispness.

CLAIMS

1. A process for making expanded, malt-flavoured confectionery shapes comprising the steps of forming an extrudable edible composition containing malted milk and malt extract as main ingredients; extruding said composition with an incorporated expanding agent through a die to form an extruded length of expanded malt-flavoured confection; and subsequently forming the extruded length into the required shapes.
2. A process as claimed in claim 1, wherein the expanding agent is incorporated into the composition by incorporating an expanding agent, as an ingredient of the composition.
3. A process as claimed in claim 1 or 2, wherein a gaseous or vapourisable expanding agent is incorporated into the composition by feeding such expanding agent into a pre-extrusion zone of an extruder used to extrude the composition.
4. A process as claimed in claim 1, wherein both carbon dioxide and a bicarbonate are incorporated as expanding agents.
5. A process as claimed in any preceding claim, wherein the malted milk and malt extract are provided in powder form in the composition.
6. A process as claimed in any preceding claim, wherein the composition to be extruded may contain, in addition to the malted milk and malt extract, at least one additional ingredient selected from skim milk powder, whole milk powder, glucose syrup, maltodextrin,

vegetable oils, vegetable fats, starches, emulsifiers, binders and flavourings.

7. A process as claimed in any preceding claim, wherein the composition being extruded has a moisture content which does not exceed about 10 wt% of the total weight of the composition.
8. A process as claimed in any preceding claim, wherein the extruding step is effected in an extrusion cooker.
9. A process as claimed in claim 8, wherein the extrusion cooker is of the twin-screw type.
10. A process as claimed in claim 9, wherein the screws of the cooker extruder are co-rotated.
11. A process as claimed in any preceding claim, wherein the extruding step is effected at an elevated temperature which does not exceed 100°C.
12. A process as claimed in claim 11, wherein the extruding step is effected at a temperature in the range of 40 to 70°C.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 97/00716

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 A23L1/185 A23C9/18 A23G3/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A23L A23C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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